CLAIMS

1. A method of making polymer-based pellets that have utility in extrusion and melt spun manufacturing processes, each pellet containing at least one phase change material, comprising the steps of:

melting a dispersing-polymer to form a melt;

adding phase change material to said melt to form a dispersion having phase change material generally uniformly dispersed throughout said dispersion;

cooling said dispersion to form a solid; and

processing said solid to form polymer-based pellets, each pellet containing said phase change material.

2. The method of claim 1 including said step of processing said solid includes the step of:

blending a thermoplastic-polymer with said solid prior to forming said polymer-based pellets.

3. The method of claim 1 wherein said polymer-based pellets each contain from about 10 to about 30 weight percent of said phase change material.

4. The method of claim 2 wherein said polymer-based pellets each contain from about 10 to about 30 weight percent of said phase change material.

5. The method of claim 1 wherein said dispersing-polymer is a low molecular weight polymer.

6. The method of claim 1 wherein said dispersing-polymer is a polyethylene homopolymer.

7. The method of claim 2 wherein said dispersing-polymer is a low molecular weight polymer having an affinity for said phase change material, and wherein said thermoplastic-polymer is a high molecular weight polymer having an affinity for said low molecular weight polymer.

8. The method of claim 2 wherein said dispersing-polymer is a low molecular weight polymer, and wherein said thermoplastic-polymer is a high molecular weight polymer selected from the group polyamides, polyamines, polyimides, polyacrylics, polycarbonates, polydienes, polyepoxides, polyesters, polyethers, polyflouocarbons, formaldehyde polymers, natural polymers, polyolefins, polyphenylenes, silicon containing polymers, polyurethanes, polyvinyls, polyacetals and polyarylates.

9. The method of claim 1 wherein said phase change material is encapsulated phase change material.

10. The method of claim 1 wherein said phase change material is physically contained by the addition of a material selected from the group silica, fumed silica and zeolite.

11. The method of claim 1 wherein said step of processing said solid to form said polymer-based pellets includes an extrusion step.

12. The method of claim 1 wherein said step of adding phase change material to said melt includes adding a phase change material wet cake to said melt, and including the step of heating said melt until a water content of said melt is reduced to about 0.15 weight percent.

13. The method of claim 12 wherein said polymer-based pellets each contain from about 15 to about 25 weight percent of said phase change material.

14. A method of manufacturing polymer-based pellets that are useable in extrusion and melt spun processes to form plastic articles, comprising the steps of:

providing at least one water-based phase change material;

providing a low molecular weight polymer having an affinity for said phase change material;

providing a high molecular weight polymer having an affinity for said low molecular weight polymer and having physical characteristics compatible with an intended use of said plastic articles;

melting said low molecular weight polymer to form a first melt;

generally uniformly blending said phase change material into said first melt to form a first blend;

cooling said first blend to form a first solid;

processing said first solid to form granules;

melting said high molecular weight polymer to form a second melt;

generally uniformly blending said granules into said second melt to form a second blend;

cooling said second blend to form a second solid; and

processing said second solid to form said polymer-based pellets.

15. The method of claim 14 wherein said polymer-based pellets each contain from about 10 to about 30 weight percent of said phase change material.

16. The method of claim 14 wherein:

said low molecular weight polymer is selected from the group homopolymers of polyethylene, polypropylene, Nylon 12, polybutylene terephthalate, and copolymers of polyethylene-co-vinyl acetate, polyethylene-co-acrylic acid, polybutylene terphthalate-co-polytetramethylene terephthalate, and polylauryllactam-block-polytetrahydrofuran; and

said high molecular weight polymer selected from the group polyamides, polyamines, polyimides, polyacrylics , polycarbonates, polydienes, polyepoxides, polyesters, polyethers, polyflourocarbons, formaldehyde polymers, natural polymers, polyolefins, polyphenylenes, silicon containing polymers, polyurethanes, polyvinyls, polyacetals, and polyarylates.

17. The method of claim 14 wherein said phase change material is an encapsulated phase change material.

18. The method of claim 14 wherein said phase change material is physically confined to a plurality of physical volumes by the addition of a material selected from the group silica, fumed silica and zeolite.

19 The method of claim 14 wherein said step of processing said first-solid and said step of processing said second-solid each include an extrusion step.

20. The method of claim 14 wherein said step of adding said phase change material to said first-melt includes adding a wetcake of said phase change material to said first-melt, and including the step of heating said first-melt until a water content of said first-melt is reduced to at least about 0.15 weight percent.

21. The method of claim 20 wherein said polymer-based pellets each contain from about 15 to about 25 weight percent of said phase change material.

22. The method of claim 14 wherein said phase change material is microencapsulated within a plurality of hollow shells, and wherein said low molecular weight polymer includes a polymer-constituent having an affinity for material forming said hollow shells.

23. The method of claim 14 wherein said phase change material is encased in a plurality of nylon shells, and wherein said low molecular weight polymer includes a nylon constituent.

24. A method of manufacturing polymer-based pellets that are useable in an extrusion/melt spun process to produce synthetic fibers having phase change material therein, said method comprising the steps of:

providing at least one water-based phase change material;

providing a low molecular weight polymer having an affinity for said phase change material;

providing a high molecular weight polymer having an affinity for said low molecular weight polymer and having physical characteristics selected in accordance with an intended use of said synthetic fibers;

melting said low molecular weight polymer to form a first melt;

blending said phase change material into said first-melt to form a first blend;

heating said first-blend until a water content of said first blend is generally eliminated;

cooling said first blend to form a first solid;

physically processing said first solid to form granules;

melting said high molecular weight polymer to form a second melt;

generally uniformly blending said granules into said second melt to form a second blend;

cooling said second blend to form a second solid; and

physically processing said second solid to form said polymer-based pellets.

25. The method of claim 24 wherein said polymer-based pellets each contain from about 10 to about 30 weight percent of said phase change material.

26. The method of claim 24 wherein said phase change material comprises a plurality of individual physical volumes of phase change material, each individual volume being encapsulated within a hollow shell, and wherein said low molecular weight polymer has an affinity for said hollow shells.

27. The method of claim 24 wherein said step of physically processing said first-solid and said step of physically processing said second solid each include an extrusion step followed by a pulverizing step.

28. The method of claim 24 wherein said step of heating said first melt includes heating said first melt until a water content of said first melt is reduced to at least about 0.15 weight percent.